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## Lunch Bot : Furikake drawing machine to make Charaben

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### Abstract

LunchBot is a kind of drawing machine. It can draw shape on rice with seasoning powder of food (furikake).

### 1. Food Printing

With spreading 3D-printing technology, many materials appear. Food is popular one.



Figure.1 Fab@Home

Fab@Home created in creative machine lab at Cornell University, is a one of first wide-spreading personal 3D Printer. Instead of plastic extruder, it has unique syringe to

make object out of multiple materials. Chocolate, masa, paste of crams and meats have printed from Fab@Home.



Figure2. PancakeBot

Pancakebot also use syringe, but it specialize in printing pancake on heated griddle. It combines original software to create/trace design and we can easily use it.

ChefJet Pro is industrial 3D printer for food. From water, sugar, flavor and food coloring, it prints candy and sugar confectionery in many shapes and colors. While Fab@Home is FDM printer, ChefJet adopt SLS method.

## 2. Digital fabrication with white rice

As described above, food printing technology have many forms, and there are various food material. In Japan, white rice is staple and very popular food. In nowadays, digital fabrication with using white rice is appearing.

Kitchen 3D Printer can print white rice paste. Like Fab@Home, it extrudes rice pastes from syringe with compressed air. After printing, object has to be heated in oven, and they will be edible.

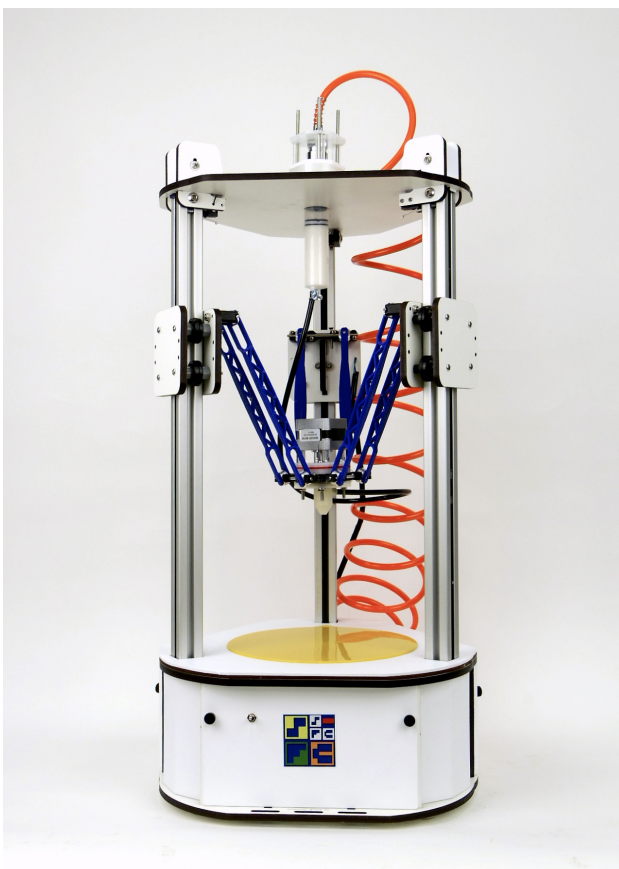


Figure3. kitchen 3D Printer  
(Moeka Watanabe, Hiroya Tanaka  
Laboratory, Keio University)



Figure4. Printed Thing

In Fablab Kamakura (Youka Watanabe, Mio Kato and Misato Komano), they made a 3D-printed mold for curry and rice. Because white rice have proper stickiness and softness (not too hard), they are suitable to shape 3D objects.



Figure5. 3D molded white rice

## 4.LunchBot

From old days, Japanese people make white rice into many shapes. Rice ball, triangular or sphere shape rice, is famous one. They fill many kinds of bento (Japanese lunch box) with side dishes and

white rice.

Many Japanese create their bento with well-decorated food like shape of human, animals or characters from popular media. This "Charaben (Character Bento)" culture is one way to express their technique and creativity, and people enjoy appearance and taste of it.

However, it needs advanced technology in cooking to make good looking Charaben, and this may limit the number of people concerned with it.

LunchBot is a new type of fabrication machine to assist people to make a good Charaben. This machine sprinkles furikake over rice in bento box. Furikake is Japanese traditional seasoning powder like black sesames, roasted eggs or seaweed. With LunchBot, people can create shapes with furikake easily.

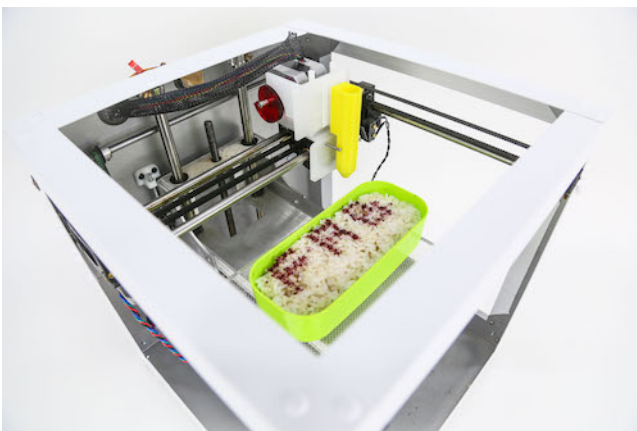


Figure7. LunchBot

LunchBot is made from Solidoodle, commercially available RepRap type 3D printer.

I removed existing extruder and newly attached stepper motor linked to cam gears of the both ends. Once these gears rotate, vertical moving syringe, which is filled with furikake, drops furikake powder one time. If you want to change color, you have to change syringes directly by hand.

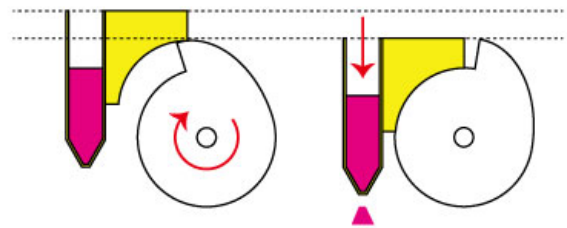


Figure8. Cam gear and syringe

G-Code generator for LunchBot is designed by Processing. You can load graphic data and divide it into every color, and then you can get G-Code for sprinkling furikake on proper position.

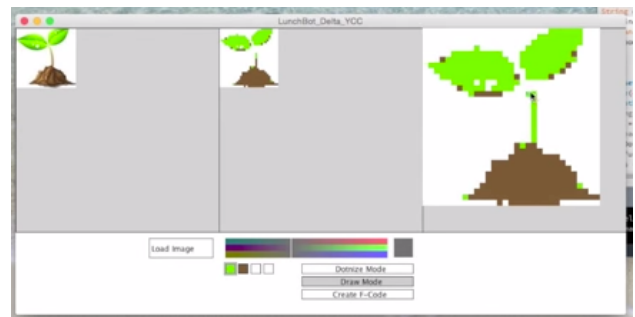


Figure9. G-Code generator

#### 4-1. System



## 4-2. Appreciation

I showed LunchBot in some exhibitions. In "Green Drinks Yokohama vol.17 Food and Farming × Creative in Yokohama", some farmers and housewives came and saw it. Some people said "I want to draw messages for family, or calorie of bento". One farmer told me that she wants to use their vegetables with this machine.

In "The 8th NicoNico gakkai β", many people came and laughed. In then, LunchBot could draw less than  $95 \times 95$  pixels, so one scientist said, "I'm disappointed at this rough resolution". Another one said "It will be more good if it can discretize food more correctly".



Figure10. Displayed Sample

## 5. Conclusion and Future Work

From appreciation of people, LunchBot proved to need more improved structure for drawing furikake pictures. However, the

way of drawing messages and pictures on rice is generally accepted. This may mean that food fabrication is one way of communication.

For study, I drew AR marker with LunchBot, and put some information on it. It can be a new form of communication through food.



Figure11. AR marker on rice

I developed and displayed LunchBot. There are many things to have to improve, but I can show a new possibility of food fabrication. More and more people will enjoy making their foods as a communication tools with digital fabrication.

## References

Figure1.

<http://inhabitat.com/3d-printers-could-some-day-feed-astronauts-in-space/>

Figure2.

<https://www.kickstarter.com/projects/1853707494/pancakebot-the-worlds-first-panca>

ke-printer

Figure 3,4

<http://fab.sfc.keio.ac.jp/?projects=developing-food-3d-printer-kitchen-3d-printer&class=Projects:@Technology:=Food%203d%20Printer>